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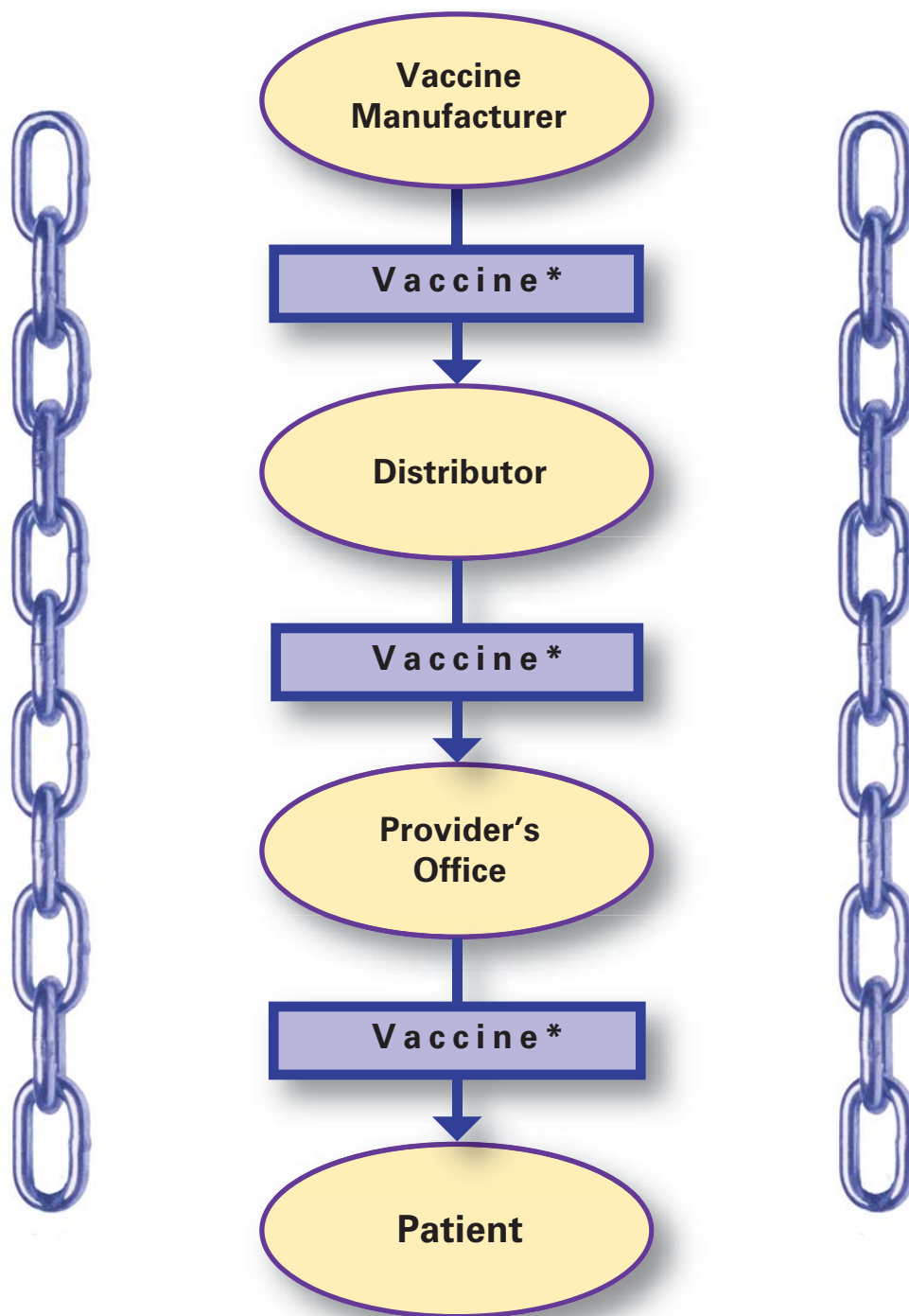
What Is the Cold Chain?

Vaccines must be stored properly from the time they are manufactured until the time they are administered. Excess heat or cold will reduce their potency, increasing the risk that recipients will not be protected against vaccine-preventable diseases. The system used to keep and distribute vaccines in good condition is called the “cold chain.” The cold chain has three main components: transport and storage equipment, trained personnel, and efficient management procedures. All three elements must combine to ensure safe vaccine transport and storage.

The cold chain begins with the refrigerator or freezer at the vaccine manufacturing plant, extends through the transfer of vaccine to the distributor and then to the provider’s office, and ends with the administration of the vaccine to the patient. Proper storage temperatures must be maintained at every link in the chain.

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The Cold Chain

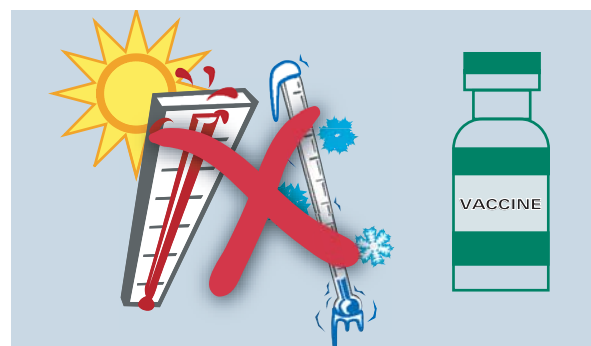


***Vaccine is transported in a refrigerated or frozen state, as appropriate (refrigerator 35°– 46°F [2°– 8°C]; freezer 5°F [-15°C] or colder), using an insulated container or a refrigerated truck.**

Importance of Maintaining the Cold Chain

Vaccine Potency

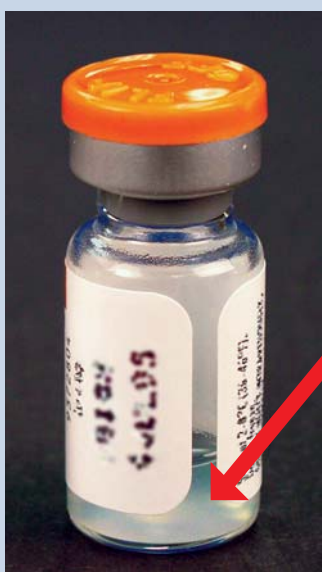
Excessive heat or cold exposure damages vaccine, resulting in loss of potency. Once potency is lost, it can never be restored. Furthermore, each time vaccine is exposed to heat or cold, the loss of potency increases and eventually, if the cold chain is not correctly maintained, all potency will be lost, and the vaccine becomes useless.



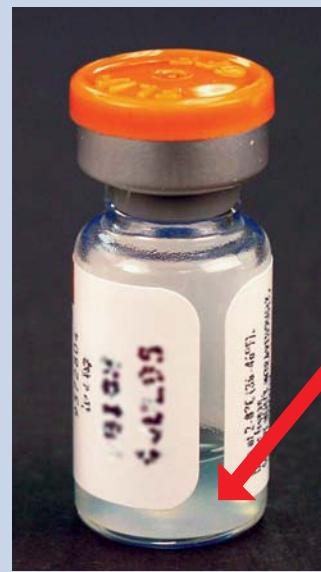
Excessive heat or cold damages vaccines.

Vaccine Appearance After Exposure to Inappropriate Storage Conditions

Some vaccines may show physical evidence of altered potency when exposed to inappropriate storage conditions, such as clumping in the solution that does not go away when the vial is shaken. Other vaccines may look perfectly normal when exposed to inappropriate storage conditions. For example, inactivated vaccines exposed to freezing temperatures (i.e., 32°F [0°C] or colder) may not appear frozen and give no indication of loss of potency. Therefore, visual inspection of vaccines is an unreliable method of assuring potency.




Properly stored vaccine
Full potency



Improperly stored vaccine
Diminished potency

Visual inspection of vaccines is an unreliable method of assuring potency.

Burden of Cold Chain Failure

An estimated 17% to 37% of providers expose vaccines to improper storage temperatures. Refrigerator temperatures are more commonly kept too cold rather than too warm.^{1,2} One study involving site visits showed that 15% of refrigeration units had temperatures of 34°F (1°C) or lower.² Out-of-range temperatures require  **immediate action**.

Loss of vaccine potency due to improper storage conditions is a costly mistake. Patients receiving vaccine with decreased potency caused by improper storage conditions may not be fully protected against vaccine-preventable disease. In the General Recommendations on Immunization, the Advisory Committee on Immunization Practices (ACIP) and the American Academy of Family Physicians (AAFP) state that mishandled vaccine doses should not be counted as valid doses and should be repeated unless serologic testing indicates a response to the vaccine.³ Recalling patients to repeat vaccine doses because vaccine has been stored improperly can damage public confidence in vaccines and in your practice.

Vaccines are also expensive. The vaccines needed for a single infant visit can cost \$90 to \$103 or more. For toddlers, vaccine costs jump to \$123 to \$161 or more per child. The vaccines needed for one child at school entry cost \$38 to \$56 or more.⁴ Avoid extra expenses by following procedures to maintain the cold chain.



Store each vaccine in its proper location.

References

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